

Claims

1. A printhead for an ink jet printer responsive to control and data signals, comprising:

a plurality of ink ejectors for ejecting ink when actuated;

a power circuit for selectively applying power to selected ink ejectors to

5 actuate the ink ejectors and eject ink;

a control circuit responsive to data signals for controlling the operation of the power circuit to actuate selected ejectors based on the data signals;

the power circuit including a compensation circuit controlled by the control circuit for reducing the resistance of the power circuit in response to the control
10 signals, whereby resistance of the compensation circuit is reduced in response to predetermined parameter conditions.

2. The printhead of claim 1 wherein a compensation circuit is connected to each ink ejector and each compensation circuit comprises:

a first switch having a first internal resistance and being connected to actuate an associated ink injector when the first switch is turned on;

5 a second switch having a second internal resistance and being connected to actuate the associated ink ejector when the second switch is turned on, said first and second switches being connected in parallel with each other; and

said control circuit being interconnected with said first and second switches for selectively actuating the associated ink ejector by either (1) switching the first
10 switch on or (2) switching the first and second switches on, whereby the resistance of the compensation circuit may be reduced by switching both the first and second switches on as compared to switching on only the first switch.

3. The printhead of claim 1 wherein each compensation circuit comprises:

a first switch having a first internal resistance and being connected to actuate one associated ink injector when the first switch is turned on;

a second switch having a second internal resistance and being connected to
5 actuate the associated ink ejector when the second of switch is turned on, said first and second switches being connected in parallel with each other; and

said control circuit being connected to selectively turn on the first and second switches, said control circuit being responsive to the data signals to actuate the first switch when only one ink ejectors within a defined group is required to be actuated by

10 the data signals, and to actuate both the first and second switches when more than one ejector is required to be actuated by the data signals.

4. The printhead of claim 1 wherein each compensation circuit comprises:

X number of switches connected in parallel with each other and connected to actuate an associated ink ejector;

5 said control circuit being connected to control the X number of switches and to selectively actuate the switches said control circuit being responsive to the data signals to actuate a select number of the X number of switches based upon the data signals.

5. The printhead of claim 4 wherein the select number of switches actuated by the control circuit is proportional to the number of ink ejectors that will be actuated substantially simultaneously within a defined group.

6. The printhead of claim 4 wherein the select number of switches actuated by the control circuit is proportional to the number of ink ejectors that will be actuated substantially simultaneously within a defined group.

7. The printhead of claim 4 wherein the select number of switches actuated by the control circuit is equal to the number of ink ejectors that will be actuated substantially simultaneously within a defined group.

8. A printer comprising:

a main printer assembly including printer electronics, a media carrier, and a printhead carrier, the printer electronics for producing power signals, control signals and data signals, the data signals corresponding to an object to be printed;

5 a circuit connected to receive the power signals, control signals and data signals from the printer electronics;

a printhead mounted on the printhead carrier and connected to the circuit for receiving the power signals, the control signals and the data signals;

10 a plurality of ink ejectors disposed in the printhead for ejecting ink when actuated;

a printhead control circuit disposed in the printhead for receiving at least the data signals, the printhead control circuit including logic for receiving at least the data signals and producing printhead command signals based on the data signals;

15 a power circuit for actuating the ink ejectors in response to the printhead command signals, the power circuit including a plurality of compensation circuits for receiving the printhead command signals, each ink ejector being associated with a

single compensation circuit, each compensation circuit including X number of switches that are connected in parallel with each other, each switch in a single compensation circuit being connected to actuate a single associated ink ejector when
 20 the switch is turned on, each compensation circuit being responsive to the printhead command signals to actuate a particular number of switches in the compensation circuit to actuate the associated ink injector and eject ink.

9. The printer of claim 8 wherein the logic is configured to actuate only one switch of the X number of switches in a compensation circuit to actuate a particular ink ejector when the following conditions exist: (1) the particular ink ejector is associated with a particular power signal and (2) only one of the ink ejectors
 5 associated with the particular power signal will be actuated in a predetermined time interval based on the data signals.

10. The printer of claim 8 wherein the logic is configured to actuate a select number of switches of the X number of switches in a compensation circuit to actuate a particular ink ejector based upon: (1) a particular power signal with which the particular ink ejector associated, and (2) the number of the ink ejectors associated with
 5 the particular power signal that will be turned on in a predetermined time interval based on the data signals.

11. The printer of claim 8 wherein the logic is configured to actuate a plurality of the X number of switches in a compensation circuit to actuate a particular ink ejector when the following conditions exist: (1) the particular ink ejector is associated with a particular power signal and (2) a plurality of the ink ejectors associated with the
 5 particular power signal will be turned on in a predetermined time interval based on the data signals.

12. The printer of claim 8 wherein the logic is configured to actuate Y number of switches of the X number of switches in a compensation circuit to actuate a particular ink ejector when the following conditions exist: (1) the particular ink ejector is associated with a particular power signal and (2) a Y number of the ink ejectors
 5 associated with the particular power signal will be turned on in a predetermined time interval based on the data signals.

13. A printer comprising:

a main printer assembly including printer electronics, a media carrier, and a printhead carrier, the printer electronics for producing M number of power signals,

control signals and data signals, the data signals corresponding to an object to be and
 5 including a plurality of address dimensions, the data signals including at least Y
 number of first dimension signals and Z number of a second dimension signals,

a circuit connected to receive the power signals, control signals and data
 signals from the printer electronics;

10 a printhead mounted on the printhead carrier and connected to the circuit for
 receiving the power signals, the control signals and the data signals;

a plurality of ink ejectors disposed in the the printhead for ejecting ink, each
 ink ejector being uniquely identified with a unique combination of the power signals,
 first dimension signals and a second dimension signals, each power signal being
 associated with and providing power to a unique group of ejectors;

15 a printhead control circuit disposed in the printhead for receiving at least the
 data signals, the printhead control circuit including logic for receiving at least the data
 signals and producing printhead command signals based on the data signals;

a power circuit for actuating the ink ejectors in response to the printhead
 command signals, the power circuit including a plurality of compensation circuits for
 20 receiving the printhead command signals, each ink ejector being associated with a
 single compensation circuit, each compensation circuit including X number of
 switches that are connected in parallel with each other, each switch in a single
 compensation circuit being connected to actuate a single associated ink ejector when
 the switch is turned on, each compensation circuit being responsive to the printhead
 25 command signals to actuate a particular number of switches in the compensation
 circuit to actuate the associated ink injector and eject ink

14. The printer of claim 13 wherein the printhead control circuit further
 comprises logic for determining the number of switches to be turned on in a
 predetermined time interval in a particular compensation circuit based upon (1) the
 particular power signal associated with the ink ejector connected to the particular
 5 compensation circuit, (2) the particular unique group of ink ejectors associated with
 the particular power signal, and (3) the number of ink ejectors within the particular
 unique group that are required by the data signals to actuate within the predetermined
 time.

15. The printer of claim 13 wherein the printhead control circuit further
 comprises logic for causing the X number of switches to be turned on in a

predetermined time interval in a particular compensation circuit where: (1) the particular compensation circuit is within a particular group, (2) the particular group of compensation of circuits is associated with a particular group of ink ejectors, (3) the particular group of the ink ejectors is associated with a particular power signal, and (4) X is proportional to the number of ink ejectors within the particular group of ink ejectors that are required by the data signals to actuate within the predetermined time.

16. The printer of claim 13 wherein the printhead control circuit further comprises logic for causing the X number of switches to be turned on in a predetermined time interval in a particular compensation circuit where: (1) the particular compensation circuit is within a particular group, (2) the particular group of compensation of circuits is associated with a particular group of ink ejectors, (3) the particular group of the ink ejectors is associated with a particular power signal, and (4) X is equal to the number of ink ejectors within the particular group of ink ejectors that are required by the data signals to actuate within the predetermined time.

17. The printer of claim 13 wherein:

there are at least A and B power signals, at least two first dimension address (P1 and P2) signals, and at least two second dimension address signals, (A1 and A2)

and wherein the power circuit further comprises a first power line for connecting a first group of ink ejectors to the A power signal and a second power line for connecting a second group of ink ejectors to the B power signal;

and wherein the control circuit further comprises :

a first AND gate connected to receive the P1 first dimension address signal and the A1 second dimension address signal and produce a first output signal;

a second AND gate connected to receive the P1 and P2 first dimension address signals and the A1 second dimension address signal and produce a second output signal;

a third AND gate connected to receive the P2 first dimension address signal and the A1 second dimension address signal to produce a third output signal;

a fourth AND gate connected to receive the P1 and P2 first dimension address signals and the A1 second dimension address signal to produce a fourth output signal;

a fifth AND gate connected to receive the P1 first dimension address
 20 signal and the A2 second dimension address signal and produce a fifth output signal;
 a sixth AND gate connected to receive the P1 and P2 first dimension
 address signal and the A2 second dimension address signal and produce a sixth output
 signal;

a seventh AND gate connected to receive the P2 first dimension
 25 address signal and the A2 second dimension address signal to produce a seventh
 output signal; an eighth AND gate connected to receive the P1 and P2 first
 dimension address signals and the A2 second dimension address signal to produce an
 eighth output signal;

and wherein the ink ejectors and the power circuit further comprise at least 1-4
 30 ink ejectors and 1-8 switches, ejectors 1, 2, 3, 4 being connected to switches 1&2,
 3&4, 5&6, 7&8, respectively, where each switch will actuate one ink ejector to which
 it is connected, the 1-8 switches being connected to receive the first through the eighth
 output signals, respectively, with each switch being actuated by one output signal
 having a corresponding number, whereby the 1-8 switches are selectively actuated by
 35 the first through the eighth output signals;

and wherein ink ejectors 1-4 are in the first group connected to the A power
 line and ink ejectors 5-8 are in the second group connected to the B power line.

18. The printer of claim 13 wherein:

the power circuit further comprises M power lines for connecting M groups of
 ink ejectors to the M power signals;

and wherein the control circuit further comprises Q groups of logic gates, each
 5 logic gate in a group being controlled by combinations of the address signals,

and wherein the ink ejectors further comprise at least Q ink ejectors arranged
 into M groups of ink ejectors;

and wherein the power circuit further comprises Q groups of switches where
 each group of switches is connected to and controlled by one of the groups of logic
 10 gates, where each ink ejector is connected to a single group of switches, and each
 switch in a group will actuate the single ink ejector to which it is connected.

19. The printer of claim 13 wherein the control circuit further comprises a
 counter circuit for counting the number of ink ejectors in each group of ink ejectors
 that are to be actuated in a particular time interval and producing a count for each

- group of ink ejectors, the logic gates being responsive to the counts for each group of
- 5 ink jets to actuate a particular number of switches in each group of switches to actuate the ink ejectors, the particular numbers being based on the counts.